

CLAIMS

What is claimed is:

1. A method for positively detecting printed products delivered to a lay-down conveyor by grippers of a gripper conveyor and followed by delivery of products by the lay-down conveyor to a stacker infeed, comprising:

- a) determining, at a product release location, if a printed product is deposited from a gripper to the lay-down conveyor;
- b) accumulating a count of each deposited printed product responsive to step (a); and
- c) tracking travel of a printed product along the lay-down conveyor from said product release location.

2. The method of claim 1 wherein step (c) further includes:

- d) generating pulses each representing a given travel distance between said product release location to a given location along the lay-down conveyor downstream of the product release location.

3. The method of claim 2 further comprising:

- e) accumulating pulses generated at step (d) when a printed product is released at said product release location.

4. The method of claim 3 further comprising:

- f) detecting a presence of a leading edge of each printed product deposited on the lay-down conveyor at said given location.

5. The method of claim 4 further comprising:

g) developing an average value of a count accumulated at step (e) of a given number of counts for a given number of printed products deposited on the lay-down conveyor at the product release location; and

h) updating the average value employing a first-in/first-out (FIFO) technique.

6. The method of claim 4 further comprising:

g) determining presence of a product passing said given location; and

h) initiating tracking from said given location to an infeed nip location in the stacker infeed responsive to step (g).

7. The method of claim 5 further comprising:

g) looking for passage of a product at said given location;

h) adopting an average count when a detection operation performed in step (g) fails to detect a printed product within a given count range.

8. The method of claim 6 further comprising:

i) initiating tracking from an infeed nip of the stacker to an intercept point in the stacker responsive to accumulation of a count of pulses representing movement of the printed product from said given location to said infeed nip.

9. The method of claim 8 wherein step (g) further includes fixing a distance between said given location and said infeed nip.

10. The method of claim 1 further comprising:

d) examining each gripper as it passes downstream of the release cam location and before a next succeeding gripper reaches said release cam location to

determine if a printed product indicated as having been released at the release cam location has in fact been released; and

e) canceling tracking of a printed product from being tracked along the lay-down conveyor when step (d) indicates that a printed product was not released when the release cam was engaged.

11. In combination, a gripper conveyor having a plurality of spaced apart grippers for conveying printed products along a given path;

a release cam for releasing printed products from grippers passing a release cam location when the release cam is engaged;

a lay-down conveyor positioned beneath said release cam for receiving printed products released from grippers as they pass the release cam;

a stacker for stacking printed products positioned to receive printed products from a downstream location of the lay-down conveyor;

a gripper sensor located a given distance upstream relative to the release cam location for detecting a presence of a gripper;

a product sensor for detecting a presence of a product by a gripper which has activated the gripper sensor;

said release cam being activated to open a gripper passing the release cam responsive to a release signal;

a generator for generating a pulses representing movement of said lay-down conveyor; and

an accumulator for accumulating said pulses responsive to opening of a gripper carrying a printed product by said release cam.

12. The combination of claim 11 further comprising:

means for accumulating a count representing a number of printed products delivered to said lay-down conveyor responsive to opening of a gripper carrying a printed product by said release cam.

13. The combination of claim 12 further comprising:

means for conveying a flag signal to said stacker responsive to a given count of printed products deposited on said lay-down conveyor when a printed product associated with said given count reached an input nip of said stacker.

14. The combination of claim 11 further comprising:

a second product sensor generating a detection signal as each printed product passes a given location along the lay-down conveyor; and
means for tracking each printed product responsive to said detecting signal.

15. The combination of claim 14 further comprising:

means for tracking printed product associated with a given count from said given location to said infeed nip signal responsive to a detection signal.

16. The combination of claim 11 further comprising:

said stacker:
being positioned to receive printed products from a downstream location of the lay-down conveyor; and
having means for generating an interrupt signal.

17. The combination of claim 10 further comprising counting means for accumulating said count pulses; and

means for generating control pulses for controlling operation of the stacker when predetermined counts have been reached.

18. The combination of claim 17 wherein one of said control pulses is employed to operate a stacking blade to intercept a stream of signatures delivered to said stacker.

19. The combination of claim 16 wherein one of said control pulses is employed for operating a turntable in said stacker.

20. The combination of claim 16 wherein one of said control pulses is employed for ejecting a completed bundle from said stacker.

21. A method for tracking printed products conveyed along a path to a stacker in imbricated fashion comprising:

detecting a presence of a printed product delivered to a receiving end of said path and sending a printed product count to the stacker;

generating pulses representing a linear speed of the printed products being conveyed along said path;

detecting folded edges at a given location along the path; and

alerting the stacker as to a position of each printing product.

22. A method for tracking printed products being delivered to a stacker, comprising:

depositing printing products upon a conveyor for delivery to the stacker so that printed products are arranged in imbricated fashion with folded edges downstream;

generating pulses representing a speed of the conveyor;

initiating accumulation of said pulses for each printed product as it is deposited on the conveyor;

sensing folded edges as they pass a location along the conveyor intermediate the deposit point and the stacker;

halting counting of pulses for each printed product when the folded edge of the printed product passes the sensing point; and

forming an average count from a given number of said counts.

23. The method of claim 22 wherein accumulated counts for printed products falling outside of a given range are replaced by the average count.

24. The method of claim 22 wherein said average count is continuously updated.

25. Apparatus for tracking printed products being delivered to a stacker, comprising:

means for depositing printed products upon a conveyor for delivery to the stacker so that printed products are arranged in imbricated fashion with folded edges facing downstream;

means for generating pulses representing a speed of the conveyor;

means for accumulating said pulses for each printed product as it is deposited on the conveyor;

means for sensing printed products as they pass a given location along the conveyor intermediate the deposit point and the stacker;

means for determining a count, based accumulation of said pulses, for each printed product when the printed product passes said given location; and

means for generating an average count from counts representing a given number of the printed products that have passed said given location.

26. The apparatus of claim 25 comprising:

means for replacing accumulated counts for printed products falling outside of a given range of accumulated counts by the average count.

27. The apparatus of claim 25 wherein said average count is continuously updated.

28. The apparatus of claim 25 wherein said stacker comprises:

an infeed section;

downstream edges of printed products being spaced apart by a first given distance on said conveyor;

said conveyor having a downstream end adjacent to said infeed section;

a first transfer wheel assembly adjacent said downstream end pressing said imbricated stream of a printed products between the first transfer wheel assembly and said conveyor;

a second transfer wheel assembly at an input end of said infeed section forming an infeed nip with a stacker conveyor in said infeed section for pressing the imbricated stream of printed products between said second transfer wheel assembly and said stacker conveyor; and

said first and second transfer wheel assemblies being spaced by a second given distance which is greater than a length of printed products measured in the feed direction to assure that an upstream printed product resting on a downstream printed product whose downstream edge is entering said nip is under the influence of only the first transfer wheel assembly and the downstream printed product is under the influence of only said second transfer wheel assembly to prevent the upstream printed product from being drawn toward said nip due to a frictional force exerted upon the upstream printed product by the printed product whose folded edge is entering said nip.

29. The apparatus of claim 28 wherein said second transfer wheel assembly has transfer wheels of a diameter sufficient to assure that folded edges entering said nip are positively drawn into said nip.

30. The apparatus of claim 29 wherein said diameter is in the range of 6 to 10 inches.

31. The apparatus of claim 29 wherein the first transfer wheel assembly has wheels with diameters equal to the diameters of said second transfer wheel assembly.

32. The apparatus of claim 28 wherein the operating speeds of the conveyor moving printed products to the stacker and said stacker infeed conveyor are different.

33. The apparatus of 32 wherein the stacker infeed conveyor speed is greater than the speed of the conveyor delivering printed products to the stacker.

34. A method for controlling a stacker, comprising:
depositing printed products on a lay-down conveyor which delivers printed products to the stacker;
counting each printed product deposited on the conveyor;
associating a flag with selected printed products based on said count;
detecting when a flagged printed product reaches a given location along said conveyor, which location is a fixed distance upstream from an input nip of a stacker infeed;
tracking the flagged printed products to the nip point; and
providing a signal to the stacker to perform tracking flagged printed products between said nip and an intercept location.

35. The method of claim 34 wherein the step of tracking printed products moved by the conveyor comprise generating pulses responsive to movement of said conveyor by a given distance.

36. The method of claim 34 wherein the flagging step further comprises providing a first flag signal responsive to one given count which requires performance of an intercept and turn operation when the printed product associated with the first flag signal reaches an intercept point in the stacker and a second flag signal responsive to another given count which requires performance of an intercept and eject operator when the printed product associated with the second flag signal reaches the intercept point.

37. The method of claim 36 further comprising said stacker intercepting an incoming stream of printed products and turning a turntable responsive to receipt of said first flag signal when the printed product associated with the first flag signal reaches the intercept point.

38. The method of claim 36 further comprising said stacker intercepting an incoming stream of printed products and ejecting a completed bundle from a turntable responsive to receipt of said second flag signal when the printed product associated with the second flag signal reaches the intercept point.

39. The method of claim 1 wherein step (a) further comprises:
employing a light source/light detector assembly to detect a presence of a printed product in a gripper reaching the product release location.

40. The method of claim 4 wherein step (f) further comprises:

employing a laser sensor at said given location to detect a leading edge of passing printed products.

41. The combination of claim 11 wherein said product sensor is a light source/light detector assembly.

42. The combination of claim 14 wherein said second product sensor is a laser sensor.